Universität Trier • FB VI - Dekanat • 54286 Trier

Fachbereich VI - Dekanat

☎ 0651/201-4528
🖷 0651/201-3939
@ dekfb6@uni-trier.de

Damen und Herren
habilitierte und promovierte Angehörige
sowie
Mitglieder des Rates
des Fachbereiches VI

27.07.2021

Promotionsverfahren zur Erlangung des akademischen Grades Doktor der Naturwissenschaften (Dr. rer. nat.) von Herrn Le Tuan Ho

Sehr geehrte Damen und Herren,

die Dissertation von **Herrn Le Tuan Ho** mit dem Titel

„Growth and anatomical traits of indigenous Pinus species in the mountain ranges of South-Central Vietnam"

sowie die Berichte liegen gemäß § 8 S. 2 PromO vom 27. Juli 2016 in der Zeit

vom 29.07.2021 bis zum 26.08.2021

im Dekanat (Zi. F 126) zur Einsichtnahme aus. Die Zeit der Auslagefrist entspricht den Regelungen der PromoO des FB VI vom 27.7.2016.

Aufgrund der aktuellen Auflagen der Corona-Bekämpfungsverordnung, ist eine Einsichtnahme nur nach vorheriger Terminvereinbarung mit dem Dekanat möglich.

Vorbehaltlich einer einspruchslosen Auslage ist als Termin für die Disputation vorgesehen:

Freitag, 27.08.2021, 14:00 Uhr, via Zoom

Weitere Informationen zur Durchführung der Disputation finden Sie auf der Homepage der Universität Trier unter: Fachbereich VI > Der Fachbereich > Aktuelles > Disputationen am FB VI

Mit freundlichen Grüßen

Univ.-Prof. Dr. Thomas Udelhoven
Dekan

ABSTRACT

Pines are so successful in the temperate region, but knowledge regarding the reasons for the conspicuous absence of tropical conifers from the native forests and their growth reductions of individual tree in tropical mountain ranges remains incomplete. Here, we analysed the stem diameter increment, anatomical traits, Blue Intensity (BI), and the isotope discrimination against ^{13}C ($\Delta^{13}C$) in tree rings of *Pinus kesiya* across elevational gradients, along with *P. dalatensis* and *Pinus krempfii* occurring at intermediate elevations in the mountain ranges of South-Central Vietnam.

Height and basal area increment (BAI) of *P. kesiya,* which widely distributed pine species of southern and south-eastern Asia, decreased significantly along an elevational gradient of ~900 to ~2000 m a.s.l. This is due to lower temperatures at higher elevations exert an indirect effect on tree growth by reducing the rate of nitrogen and phosphorus mineralisation, which may be further hampered by lower concentrations of "base" cations (upon enhanced leaching by precipitation) and a negative feedback from low availability of mineralised N and P at higher elevations.

Using a dendrochronological approach, we determined the resistance, recovery, and resilience of the radial stem increment towards episodes of growth decline, as well as the accompanying variation of ^{13}C discrimination against atmospheric CO_2 ($\Delta^{13}C$) in tree rings of two palaeotropical pine species *P. dalatensis* and *P. kesiya*. We found that the vigorous growth of *P. kesiya*, which does not fall behind that of *P. dalatensis* even at the margin of its distribution area under below-optimum edaphic conditions. This is indicative of a relatively high plasticity of *P. kesiya* towards environmental factors compared to *P. dalatensis*, which, in tendency, is less resilient upon environmental stress even in the "core" region of its occurrence.

We compared the recently developed blue intensity (BI) method for determining wood density with anatomical analyses in studying three rarely investigated palaeotropical *Pinus* species with greatly differing distribution areas. We calculated the hydraulic conductance of the xylem with the Hagen-Poiseuille equation and the water potential causing 50% loss of hydraulic conductance (Ψ_{50}) on the basis of the anatomical analyses. Results of the BI and the anatomical method were closely correlated, especially for the sapwood. *P. kesiya* exhibited features that are related to the growth at drier sites and to a higher tolerance towards drought: higher wood density and cell wall:lumen ratios of its smaller xylem conduits, lower calculated hydraulic conductance and more negative Ψ_{50} values. The BI method is well suitable for determining the wood density in tropical conifers. As a fast and inexpensive method, it may be used for initial screening woody species for their water transport capacity and drought resistance.